Progesterone Receptor (1E2) Image Analysis Software User Manual Version 5.1

Ventana Medical Systems, Inc.
www.ventana.com

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Progesterone Receptor (1E2) Image Analysis Software User Manual

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Open Source and Commercial Software

Refer to the Virtuoso Reference Guide for information on Open Source and Commercial Software programs.

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About the PR (1E2) Image Analysis Software

Companion Algorithm Image Analysis Software

Welcome to the Progesterone Receptor (PR) (1E2) Image Analysis Software User Manual.

Who Should Read this Manual

System Administrators should read this user manual and use it for reference while operating the VENTANA Virtuoso software.

Introduction

The Progesterone Receptor (1E2) Image Analysis Software assists the pathologist in the semi-quantitative measurement of PR in tissues stained with Ventana Medical Systems, Inc. CONFIRM anti-Progesterone Receptor (PR) (1E2) Rabbit Monoclonal Primary Antibody (CONFIRM PR (1E2)). This application generates a PR score that can be reviewed and accepted by the pathologist, or if necessary, overridden by the pathologist. The image analysis application is an assist to the pathologist in the scoring and interpretation of PR staining on breast cancer tissues.

The Virtuoso PR (1E2) Digital Read Application allows the pathologist to view PR stained slides as images on a computer monitor, similar to what can be viewed under a microscope. While reviewing the image, the pathologist may change magnification and move freely about the image.

Related Document

For additional information on the Virtuoso software, see the following document:

- Virtuoso Reference Guide (PL-000091-US)

Technical Support

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Connection Requirements

Refer to the Virtuoso Reference Guide for information on connection requirements.

Cyber Security

Any device that is connected to a network (internally or externally) has the potential to be compromised by unauthorized access or viruses. As with most devices, the software is designed to run on a computer utilizing Microsoft Windows and virus protection software which requires the validation and implementation of the appropriate patches.

Some of the potential cyber security hazards are:

- Malicious software that alters the device software (such as viruses)
- Unauthorized access to the system that could compromise data safety
- Security of data transmitted over the Internet

Cyber security involves protecting data by preventing, detecting, and responding to malicious cyber attacks. Cyber attacks could involve computer viruses which can completely erase data or hackers who alter files or even use the device as a host to attack other devices. As serious as these hazards are, steps can be taken to maximize cyber security.

User Authorization

All software users must login with a valid user name and password. The user name and password are securely transmitted in encrypted form over the Internet or Intranet. Once a user has logged in, the user remains active in the application until the user explicitly logs out, closes the browser, or because the application closes after a period of inactivity.

Securing Networks and Servers

Network security consists of the provisions made in the computer network infrastructure, policies adopted by the network administrator to protect the network, and the network resources that prevent unauthorized access.

The following are critical steps for securing a network server:

- Physical security (servers and network infrastructure behind locked doors)
- Use of robust passwords
- System and data backups (at regular intervals)
- Data protection
- Terminating unused services
- Restricting access to used services

The following are critical steps and methodologies used to secure network and servers:

- Data protection
- Data backups (at regular intervals)
- Refusal of automatic updates from off-the-shelf software
- Antivirus software for computers and servers

Protecting Data

Establishment of a network firewall and protection of the network against viruses using anti-virus software are effective methods to protect data. Virus definitions should be kept up to date and regular scans of computers for spyware should be performed using a legitimate anti-spyware application. If viruses or spyware are found, remove them immediately.

Evaluate Your Software Settings

The default settings of most software enable all available functionality. However, hackers may be able to take advantage of this functionality to access devices. It is especially important to check the settings for software that connects to the internet (browsers, email clients, etc.). Apply the highest level of security available that still provides needed functionality.

Backup and Recovery

In order to develop a successful backup and recovery plan, comprehension of data accessibility needs and the potential impact of data loss is essential. Automatic backup procedures need to be adopted using a data backup utility.

Chapter 1: Intended Use and Indications for Use

This chapter shows comparison and reproducibility studies for the PR marker.

Intended Use and Indications for Use

The Virtuoso system provides automated digital slide creation, management, analysis, and viewing. It is intended for in vitro diagnostic use as an aid to the pathologist in the display, detection, counting, review and classification of tissues and cells of clinical interest based on particular morphology, color, intensity, size, pattern and shape.

The Virtuoso system for IHC PR (1E2) is for digital read and image analysis applications. This particular Virtuoso system is intended for use as an aid to the pathologist in the detection and semi-quantitative measurement of progesterone receptor (PR) protein in formalin-fixed, paraffin-embedded normal and neoplastic tissue. This device is an accessory to Ventana Medical Systems, Inc. CONFIRM anti-Progesterone Receptor (PR) (1E2) Rabbit Monoclonal Primary Antibody assay. The CONFIRM anti-Progesterone Receptor (PR) (1E2) Rabbit Monoclonal Primary Antibody assay is indicated for use as an aid in the assessment of breast cancer patients for whom endocrine treatment is being considered (but is not the sole basis for treatment).

Note: **The IHC PR (1E2) Digital Read and Image Analysis applications are adjunctive computer-assisted methodologies for the qualified pathologist in the acquisition and measurement of images from microscope glass slides of breast cancer specimens stained for the presence of PR protein. The pathologist should verify agreement with the Image Analysis software application score. The accuracy of the test results depends on the quality of the immunohistochemical staining. It is the responsibility of a qualified pathologist to employ appropriate morphological studies and controls as specified in the instructions for the CONFIRM anti-Progesterone Receptor (PR) (1E2) Rabbit Monoclonal Primary Antibody assay used to assure the validity of the Virtuoso system for IHC PR Digital Read and Image Analysis scores. The actual correlation of CONFIRM anti-Progesterone Receptor (PR) (1E2) Rabbit Monoclonal Primary Antibody to clinical outcome has not been established.**

Summary and Explanation

The Virtuoso system with the PR (1E2) algorithm is a software system designed to assist the qualified pathologist in the consistent quantitative assessment of protein expression in immunohistochemically (IHC) stained histologic sections from formalin-fixed, paraffin-embedded (FFPE) normal and neoplastic tissues. The Virtuoso system can be used for review of digitized images of histologic sections with image analysis algorithms (Companion Algorithm Image Analysis applications), or without image analysis algorithms (Virtuoso Digital Read applications).

Digital Read applications present images on the computer screen in the same manner as one would see with a manual microscope, inclusive of the pathologist's ability to select any areas of interest and the option of various magnification levels. For the Companion Algorithm Image Analysis applications, the pathologist may use the system software to select and outline one or several field of views (FOVs), and each FOV may be viewed at various magnifications and then analyzed by the software; a count of the total number of target cells and the number interpreted by the algorithm as positive and negative is generated. The pathologist can accept the score provided by the algorithm, or may override the score with a pathologist score. The system requires competent human intervention at all steps in the analysis process, and the software makes no independent interpretations of the data.

The Virtuoso system consists of image analysis algorithms and software with a user interface. Virtuoso software is an end-to-end digital pathology software solution that allows pathology laboratories to acquire, manage, view, analyze, share, and report on digital images of pathology specimens. Using the Virtuoso software, the pathologist can view digital images at various magnifications (as previously stated), add annotations, make measurements, perform image analysis, and generate reports.

Test Principles

The Virtuoso system with the PR (1E2) image analysis algorithm employs image analysis techniques to obtain PR scoring. Pre-defined parameters are used to obtain PR scores. The identification of the nucleus is carried out automatically by the image analysis algorithms. The steps involved in the analysis algorithms are:

1. Enhancing the image. This process increases the contrast to make the image more suitable for analysis.
2. Identifying the epithelial area. The epithelial area is the region of the image where there is the possibility of epithelial cells being present.
3. Identifying the nucleus.
4. Classifying the cells based on extent, intensity, and thickness of nuclear staining.
5. Computing the score.

Warnings and Precautions

For *in vitro* diagnostic (IVD) use.

It is important that glass slides with acceptable staining quality be used.

Pre-Analytical Variables

Tissue preparation and staining should follow the recommendations provided in the CONFIRM PR (1E2) package insert. For optimal image capture using the Virtuoso system, it is recommended that the tissue be free of folds and be placed on the slide with a minimum of 2 mm boundary from the edge on all sides. The cover slip and slide label (if present) should not overhang the edges of the slide. For further information on scanning, please refer to the appropriate iScan Reference Guide.

Procedure

Refer to Virtuoso Reference Guide.

Required Materials Not Provided

The Virtuoso system with the PR (1E2) image analysis algorithm requires use of the CONFIRM anti-PR (1E2) monoclonal antibody, and any additional material or supplies listed in the CONFIRM anti-Progesterone Receptor (PR) (1E2) Rabbit Monoclonal Primary Antibody package insert, to stain tissues prior to analysis. The iScan Coreo scanner is required for scanning of the slides.

Results

The Virtuoso system with the PR (1E2) image analysis algorithm produces a staining score. The pathologist views the image and the instrument score, makes an assessment, and reports a score which may not be the same as the instrument score. Refer to the Virtuoso Reference Guide for an example of a report.

Limitations

The algorithms are designed to work for CONFIRM PR (1E2) cell nuclei staining. The test results are only as good as the quality and accuracy of the immunohistochemistry slide that is imaged, and the subsequent image that is analyzed. The pathologist must validate the CONFIRM PR (1E2) staining run by manual microscopic examination of the PR control slides to verify that the expected results have been obtained before images from patient slides are acquired by the Virtuoso program. The pathologist must follow the manufacturer's recommendations for the CONFIRM PR (1E2) including using all the positive and negative quality control materials for each staining run. If the control slides are not acceptable with manual microscopic examination, the patient tissues need to be re-stained with acceptable results. (See the CONFIRM PR (1E2) staining package insert for details about quality control recommendations.) The pathologist must follow the CONFIRM PR (1E2) recommendations for surveying the entire breast cancer specimen to assess any heterogeneity in the CONFIRM PR (1E2) staining, the degree of background staining, cytoplasmic staining, edge effect, etc. as recommended in the CONFIRM PR (1E2) package insert (available at www.ventana.com). If the images captured have different staining (nuclear, cytoplasm, etc.), incorrect results will be generated. Incorrect results will also be generated if the image quality cannot be analyzed. The software algorithms determine whether the quality of an image can be analyzed, based on pre-defined parameters. Refer to the Virtuoso Reference Guide for more information.

The PR (1E2) image analysis algorithm will reject nuclei that are elongated regardless of the overall shape of the cell. For this reason, tumors containing large numbers of cells with elongated nuclei may need to be evaluated manually. In addition, performance of the Virtuoso system with the following types of breast cancers has not been evaluated: carcinoma in situ, carcinosarcoma, comedo carcinoma, cystosarcoma phylloides, medullary carcinoma of the breast, mucinous variants of breast cancer, and spindle cell carcinoma.

This device has not been tested, or its safety and effectiveness validated, when used with a personal computer (PC) from home.

According to the 1988 Clinical Laboratory Improvement Amendments (CLIA '88), each laboratory that introduces an FDA cleared system must demonstrate that it can obtain performance specifications comparable to those established by the manufacturer. Please see “Performance Characteristics” below to review those specifications.

As with any change in diagnostic methodology, and especially one that relies on visual interpretation of complex images, a transition from conventional microscopy to digital microscopy presents the possibility of unintended, but systematic changes in diagnostic performance. Users should be aware that their IHC categorizations may be biased when switching from conventional to digital microscopy and as such, training beyond self study should be undertaken as needed to assure concordance before clinical adoption of the device. The laboratory is responsible for ensuring that concordance goals are reached and maintained.

Performance Characteristics

Performance of the staining agent is described in the CONFIRM PR (1E2) package insert. See “Chapter 2: PR Comparison and Reproducibility Studies” on page 7. for a description of the performance of the software.

Assay Cutoff

The performance of the Virtuoso system with the PR (1E2) image analysis algorithm was evaluated at the CAP/ASCO recommended clinical cutoffs: 0-0.99% was considered a negative test result and 1-10% and >10% were considered positive test results.

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Chapter 2: PR Comparison and Reproducibility Studies

This chapter shows comparison and reproducibility studies for the PR marker. For these slides, scanning was performed using the iScan Coreo scanner. Scanner settings were as follows: Magnification: 20x, Focus Approach: Routine Scan, Scan Approach: Regular, AOI Detect Approach: Standard.

PR Marker Studies

Staining Procedure

Refer to the CONFIRM anti-Progesterone Receptor (PR) (1E2) Rabbit Monoclonal Primary Antibody package insert for the BenchMark XT and BenchMark ULTRA instruments, *ultra*View, and *i*VIEW detection.

Performance with BenchMark XT Stainer

Study Devices and Samples

The PR (1E2) comparison and reproducibility studies for the Virtuoso Digital Read and Companion Algorithm Image Analysis consisted of 120 de-identified archived breast carcinoma sections immunohistochemically stained with CONFIRM anti-Progesterone Receptor (PR) (1E2) Rabbit Monoclonal Primary Antibody on the BenchMark XT stainer. Study test samples covered the ranges of 0-0.99%, 1-10% and >10%, and were interpreted at three different sites by three different pathologists. All test slides were scanned at 20X magnification and all images were output in bif file format.

The table below shows the concordance results for CONFIRM anti-Progesterone Receptor (PR) (1E2) Rabbit Monoclonal Primary Antibody staining interpretation among three different sites:.

1. Digital Read vs Manual Method

Table 2-1 Digital Read for PR.

Confusion Matrix		Digital					
		Site 1		Site 2		Site 3	
		(n = 112)		(n = 114)		(n = 116)	
		Neg	Pos	Neg	Pos	Neg	Pos
Manual	Neg (0-0.99%)	50	3	51	0	52	1
	Pos (1-10%, >10%)	3	56	3	60	8	55
	% Agreement	95%		97%		92%	
	(95% CI)	(89% - 98%)		(93% - 99%)		(86% - 96%)	
Negative % Agreement		94%		100%		98%	
(95% CI)		(85% - 98%)		(93% - 100%)		(90% - 100%)	
Negative % Agreement		95%		95%		87%	
(95% CI)		(86% - 98%)		(87% - 98%)		(77% - 93%)	

2. Image Analysis vs Manual Method.

Table 2-2 Image Analysis for PR.

Confusion Matrix		Image Analysis					
		Site 1		Site 2		Site 3	
		(n = 112)		(n = 115)		(n = 114)	
		Neg	Pos	Neg	Pos	Neg	Pos
Manual	Neg (0-0.99%)	50	2	51	2	51	1
	Pos (1-10%, >10%)	7	53	2	60	8	54
	% Agreement	92%		97%		92%	
	(95% CI)	(85% -	96%)	(91 -	99%)	(86% -	96%)
Negative % Agreement		96%		96%		98%	
(95% CI)		(87% - 99%)		(87% - 99%)		(90% - 100%)	
Negative % Agreement		88%		97%		87%	
(95% CI)		(78% - 94%)		(89% - 99%)		(77% - 93%)	

Intra-System and Inter-System Studies

The study was designed to demonstrate inter- and intra-Virtuoso system reproducibility for Virtuoso Digital Read and Companion Algorithm Image Analysis applications. For intra-system studies, a randomly selected subset of 40 cases that span the range of the PR scoring categories (0-0.99%, negative, 1-10%, positive, and >10%, positive) were used.

1. Intra-pathologist/Inter-Day (pair-wise comparisons, Session1 vs Session 2, Session1 vs Session 3, Session 2 vs Session 3).

Table 2-3 Intra- Pathologist Digital Read.

Confusion Matrix			Intra-Pathologist Digital					
			Session 2		Session 3		Session 3	
			Neg	Pos	Neg	Pos	Neg	Pos
			19	20	21	18	21	18
Session 1	Neg	20	17	2	18	1		
	Pos	20	2	18	3	17		
Session 2	Neg	19					17	2
	Pos	20					4	16
% Agreement			90%		90%		85%	
(95% CI)			(76% - 96%)		(76% - 96%)		(70% - 93%)	

2. For Intra-Pathologist Image Analysis.

Table 2-4 Intra-Pathologist Image Analysis.

Confusion Matrix			Intra-Pathologist Image Analysis					
			Session 2		Session 3		Session 3	
			Neg	Pos	Neg	Pos	Neg	Pos
			17	22	18	21	18	21
Session 1	Neg	18	17	1	17	1		
	Pos	21	0	21	1	20		
Session 2	Neg	17					17	0
	Pos	22					1	21
% Agreement			97%		95%		97%	
(95% CI)			(87% - 100%)		(83% - 99%)		(87% - 100%)	

3. Inter-pathologist (pair-wise comparisons, Pathologist 1 vs Pathologist 2, Pathologist 1 vs Pathologist 3, Pathologist 2 vs Pathologist 3).

Table 2-5 Inter-Pathologist Digital Read.

Confusion Matrix			Inter-Pathologist Digital					
			Site 2		Site 3		Site 3	
			Neg	Pos	Neg	Pos	Neg	Pos
			54	60	60	56	60	56
Site 1	Neg	53	51	1	50	2		
	Pos	59	2	57	7	52		
Site 2	Neg	54					50	2
	Pos	60					6	54
% Agreement			97%		92%		93%	
(95% CI)			(92% - 99%)		(85% - 96%)		(87% - 96%)	

4. Inter-Pathologist Image Analysis.

Table 2-6 Inter-Pathologist Image Analysis.

Confusion Matrix			Inter-Pathologist Image Analysis					
			Site 2		Site 3		Site 3	
			Neg	Pos	Neg	Pos	Neg	Pos
			53	62	60	55	60	55
Site 1	Neg	57	50	6	54	2		
	Pos	55	0	55	3	52		
Site 2	Neg	53					52	1
	Pos	62					8	54
% Agreement			95%		95%		92%	
(95% CI)			(89% - 97%)		(90% - 98%)		(86% - 96%)	

Scanner Precision Studies

Forty (40) cases representing the useful categories of <1%, 1-10%, and 10% positive staining for PR were scanned on three different scanners at three different sites to assess inter-scanner precision, and the same three FOVs (total = 120) were captured and evaluated each time by the image analysis application. Limiting the study to image analysis only ensured that only scanner precision was under evaluation, as all other factors were kept constant. Similarly, these same 40 and three FOVs per case were scanned on three different days by the same scanner to assess intra-scanner/inter-day precision.

Pairwise comparisons were performed between each of the three sites (inter-scanner), and between each of the three days (sessions, intra-scanner). The precision tables are found below.

Table 2-7 PR Inter-Scanner Agreement Rates (Site to Site).

Image Analysis	Virtuoso PR (1E2) Results- Site 2			
Virtuoso PR (1E2) Results- Site 1	<1%	1-10%	>10%	Total
<1%	68	3	0	71
1-10%	0	7	1	8
>10%	0	0	38	38
Total	68	10	39	117
Overall Percent Agreement: 96.6% (113/117) 95% CI: (91.5% to 98.7%)				

Image Analysis	Virtuoso PR (1E2) Results- Site 3			
Virtuoso PR (1E2) Results- Site 1	<1%	1-10%	>10%	Total
<1%	71	0	0	71
1-10%	2	6	0	8
>10%	0	1	37	38
Total	73	7	37	117
Overall Percent Agreement: 97.4% (114/117)95% CI: (92.7% to 99.1%)				

Image Analysis	Virtuoso PR (1E2) Results - Site 3			
Virtuoso PR (1E2) Results- Site 2	<1%	1-10%	>10%	Total
<1%	68	0	0	68
1-10%	5	5	0	10
>10%	0	2	37	39
Total	73	7	37	117
Overall Percent Agreement: 94.0% (110/117) 95% CI: (88.2% to 97.1%)				

Conclusion (PR Inter-scanner)

Overall inter-scanner percent agreements for the three categories ranged from 94.0% to 97.4% for all FOVs combined
.

Table 2-8 PR Intra-Scanner/Inter-Day Agreement Rates (Session-to-Session).

Image Analysis	Virtuoso PR (1E2) Results- Session 2			
Virtuoso PR (1E2) Results- Session 1	<1%	1-10%	>10%	Total
<1%	68	0	0	68
1-10%	2	8	0	10
>10%	0	1	38	39
Total	70	9	38	117
Overall Percent Agreement: 97.4% (114/117)95% CI: (92.7% to 99.1%)				

Image Analysis	Virtuoso PR (1E2) Results- Session 3			
Virtuoso PR (1E2) Results- Session 1	<1%	1-10%	>10%	Total
<1%	64	1	0	65
1-10%	1	9	0	10
>10%	0	0	36	36
Total	65	10	36	111
Overall Percent Agreement: 98.2% (109/111) 95% CI: (93.7% to 99.5%)				

Image Analysis	Virtuoso PR (1E2) Results- Session 3			
Virtuoso PR (1E2) Results- Session 2	<1%	1-10%	>10%	Total
<1%	65	2	0	67
1-10%	0	8	1	9
>10%	0	0	35	35
Total	65	10	36	111
Overall Percent Agreement: 97.3% (108/111) 95% CI: (92.4% to 99.1%)				

Conclusion (PR Intra-scanner/Inter-day)

Overall percent agreements for the three categories ranged 97.3% to 98.2% for all FOVs combined.

Additional Analyses:

The precision data for the Virtuoso PR system also underwent analysis for percent coefficient of variation (%CV); this could be achieved as the system provides a quantitative output that is then interpreted as a semi-quantitative (<1%, 1-10%, >10%) output.

The results from the inter-scanner percent %CV analyses are presented in the table below. The %CVs were derived for each source of variability as the standard deviation (SD) for that source, divided by the mean, multiplied by 100%. %CVs of less than 10% are generally considered to demonstrate good precision. Across all 351 evaluable observations, the mean percent positivity for PR was 25.93%. The %CV for "sites" measures precision of the site-to-site scanning and, at 0.00%, demonstrates that scanning results were reproducible between sites. The %CV for "case" represents between-case biological variability, and the %CV for the residual term represents within-case, between-field biological variability, and as such, these sources of variability are outside the scope of scanner performance.
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Table 2-9 PR Inter-Scanner %CV Analyses

Parameter	Statistic	FOVs
Percent Positivity (%)	N	351
	Mean	25.926
	Site (Scanner) SD	0.000
	Site (Scanner) %CV	0.00
	FOV SD	39.112
	FOV %CV	150.86
	Residual SD	9.828
	Residual %CV	37.91

Results of the inter-day %CV analyses for PR are presented in the table below. Here, the %CV for "day" is shown to be 0.00%. Since it is impossible for a variance to be negative, the model sets the variance component to zero in those cases. Thus, a %CV of 0 should not be interpreted as a complete absence of variability for that particular source, but rather as variability that is negligible in magnitude. Thus, for the one site that repeated measurements on multiple days, reproducibility between days was shown to be extremely high. As before, the %CVs for "case" and for the residual term reflects the between-case and between-field biological heterogeneity, factors that are outside the scope of scanner performance.

Table 2-10 PR Intra-Scanner, Inter-Day %CV Analyses.

Parameter	Statistic	All FOVs
Percent Positivity (%)	N	345
	Mean	26.014
	Day SD	0.000
	Day %CV	0.00
	FOV SD	39.419
	FOV %CV	151.53
	Residual SD	9.678
	Residual %CV	37.20

Performance with BenchMark ULTRA

The Virtuoso System for IHC PR (1E2) with the Benchmark ULTRA stainer was clinically validated via a concordance study where approximately 120 cases were evaluated three ways by one pathologist at one site in a blinded fashion. Each case was scored (1) manually with a routine microscope, (2) as a digital image, and (3) by way of the image analysis application using a different order of slide presentation for each round. The manual score was compared to both the digital read (DR) result and the image analysis result.

Digital Read

Table 2-11 Digital Read for PR.

	Manual Microscopic Read		
Digital Read	**Positive**	**Negative**	**Total**
Positive	**68**	**1**	**69**
Negative	**4**	**40**	**44**
Total	**72**	**41**	**113**
Positive Percent Agreement (PPA) n/N (%) (95% CI)	**68/72 (94.4%) (86.6-97.8)**		
Negative Percent Agreement (NPA) n/N (%) (95% CI)	**40/41 (97.6%) (87.4-99.6)**		
Overall Percent Agreement (OPA) n/N (%) (95% CI)	**108/113 (95.6%) (90.1-98.1)**		

Image Analysis

Table 2-12 Image Analysis for PR

	Manual Microscopic Read		
Image Analysis Read	**Positive**	**Negative**	**Total**
Positive	71	1	72
Negative	3	39	42
Total	74	40	114
Positive Percent Agreement (PPA) n/N (%) (95% CI)	71/74 (95.9%) (88.7-98.6)		
Negative Percent Agreement (NPA) n/N (%) (95% CI)	39/40 (97.5%) (87.1-99.6)		
Overall Percent Agreement (OPA) n/N (%) (95% CI)	110/114 (96.5%) (91.3-98.6)		

Appendix A: Reagents (Antibody) Package Inserts

Reagents (Antibody) Package Inserts

Refer to the www.ventana.com website or contact Ventana Medical Systems, Inc. at (520) 887-2155 or 1-800-227-2155 (US) to obtain the CONFIRM anti-Progesterone Receptor (PR) (1E2) Rabbit Monoclonal Primary Antibody package insert.

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